

# Introduction to Power, Structural, and Technical Systems (8016/36 weeks)

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**A Demonstrating Personal Qualities and Abilities** IPST.1

- 1 Demonstrate creativity and innovation. IPST.1.1
- 2 Demonstrate critical thinking and problem solving. IPST.1.2
- 3 Demonstrate initiative and self-direction. IPST.1.3
- 4 Demonstrate integrity. IPST.1.4
- 5 Demonstrate work ethic. IPST.1.5

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**B Demonstrating Interpersonal Skills** IPST.2

- 6 Demonstrate conflict-resolution skills. IPST.2.6
- 7 Demonstrate listening and speaking skills. IPST.2.7
- 8 Demonstrate respect for diversity. IPST.2.8
- 9 Demonstrate customer service skills. IPST.2.9
- 10 Collaborate with team members. IPST.2.10

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**C Demonstrating Professional Competencies** IPST.3

- 11 Demonstrate big-picture thinking. IPST.3.11
- 12 Demonstrate career- and life-management skills. IPST.3.12
- 13 Demonstrate continuous learning and adaptability. IPST.3.13
- 14 Manage time and resources. IPST.3.14
- 15 Demonstrate information-literacy skills. IPST.3.15
- 16 Demonstrate an understanding of information security. IPST.3.16
- 17 Maintain working knowledge of current information-technology (IT) systems. IPST.3.17
- 18 Demonstrate proficiency with technologies, tools, and machines common to a specific occupation. IPST.3.18
- 19 Apply mathematical skills to job-specific tasks. IPST.3.19
- 20 Demonstrate professionalism. IPST.3.20
- 21 Demonstrate reading and writing skills. IPST.3.21
- 22 Demonstrate workplace safety. IPST.3.22

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**D Examining All Aspects of an Industry** IPST.4

- 23 Examine aspects of planning within an industry/organization. IPST.4.23
- 24 Examine aspects of management within an industry/organization. IPST.4.24
- 25 Examine aspects of financial responsibility within an industry/organization. IPST.4.25
- 26 Examine technical and production skills required of workers within an industry/organization. IPST.4.26
- 27 Examine principles of technology that underlie an industry/organization. IPST.4.27
- 28 Examine labor issues related to an industry/organization. IPST.4.28
- 29 Examine community issues related to an industry/organization. IPST.4.29
- 30 Examine health, safety, and environmental issues related to an industry/organization. IPST.4.30

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**E Addressing Elements of Student Life** IPST.5

- 31 Identify the purposes and goals of the student organization. IPST.5.31
- 32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult. IPST.5.32
- 33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects. IPST.5.33
- 34 Identify Internet safety issues and procedures for complying with acceptable use standards. IPST.5.34

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**F Exploring Work-Based Learning** IPST.6

- 35 Identify the types of work-based learning (WBL) opportunities. IPST.6.35
  - 36 Reflect on lessons learned during the WBL experience. IPST.6.36
  - 37 Explore career opportunities related to the WBL experience. IPST.6.37
  - 38 Participate in a WBL experience, when appropriate. IPST.6.38
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**G Exploring Leadership Opportunities through FFA** IPST.7

- 39 Identify the role of supervised agricultural experiences (SAEs) in agricultural education. IPST.7.39
  - 40 Participate in an SAE. IPST.7.40
  - 41 Identify the benefits and responsibilities of FFA membership. IPST.7.41
  - 42 Describe leadership characteristics and opportunities as they relate to agriculture and FFA. IPST.7.42
  - 43 Apply for an FFA degree and/or an agricultural proficiency award. IPST.7.43
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**H Applying Safety Practices in the Agricultural Mechanics Lab** IPST.8

- 44 Demonstrate safe practices in the agricultural mechanics lab. IPST.8.44
  - 45 Identify marked safety areas and posted evacuation routes. IPST.8.45
  - 46 Explain the use of eye wash stations. IPST.8.46
  - 47 Demonstrate knowledge of SDS. IPST.8.47
  - 48 Use protective clothing and equipment. IPST.8.48
  - 49 Demonstrate the use, storage, and disposal of chemicals. IPST.8.49
  - 50 Explain the use of fire protection equipment. IPST.8.50
  - 51 Demonstrate the safe use of standard and metric hand tools. IPST.8.51
  - 52 Demonstrate the safe use of power tools and equipment. IPST.8.52
  - 53 Use standard and metric precision-measuring tools. IPST.8.53
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**I Exploring Alternative Energies** IPST.9

- 54 Identify alternative energy sources. IPST.9.54
- 55 Describe the use of batteries to power agricultural equipment. IPST.9.55
- 56 Research alternative fuels. IPST.9.56

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**J Gaining an Overview of the Importance of Soil and Plant Science in the Landscaping Industry** IPST.10

- 57 Identify all major tools and equipment and their applications. IPST.10.57
- 58 Identify the operation of agricultural machinery and equipment. IPST.10.58
- 59 Explain safe highway operation of agricultural machinery. IPST.10.59
- 60 Conduct pre- and/or post-operation inspection of tractor and equipment. IPST.10.60
- 61 Conduct daily service and care of tractor and equipment. IPST.10.61
- 62 Explain how to safely connect an attachment and/or implement. IPST.10.62

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**K Understanding Precision Agricultural Management** IPST.11

- 63 Research technologies used in precision agricultural management. IPST.11.63
- 64 Explain the procedure for operating a GPS receiver. IPST.11.64
- 65 Demonstrate the ability to collect data and apply that data in developing a map. IPST.11.65

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**L Identifying Fundamentals of Engines** IPST.12

- 66 Identify the operating principles of an internal combustion engine. IPST.12.66
- 67 Explain the differences between a two-stroke and a four-stroke engine. IPST.12.67
- 68 Explain the differences between gasoline and diesel engines. IPST.12.68

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**M Understanding Fundamentals of Drive Systems** IPST.13

- 69 Identify the function and operating principles of the power train. IPST.13.69
- 70 Differentiate between power take-off (PTO) systems. IPST.13.70
- 71 Explain the operation of final drives. IPST.13.71
- 72 Explain the operation of planetary gears. IPST.13.72
- 73 Explain the operation of inboard and outboard brakes. IPST.13.73
- 74 Troubleshoot drive system components. IPST.13.74

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**N Understanding the Fundamentals of Hydraulics** IPST.14

- 75 Identify the application of hydraulics in agriculture. IPST.14.75
- 76 Explain the components of a hydraulic system. IPST.14.76

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**O Understanding Agricultural Machinery Electrical Systems** IPST.15

- 77 Explain the application of safety switches on agricultural machines. IPST.15.77
- 78 Explain the application of electricity in agricultural equipment. IPST.15.78

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**P Completing Plumbing Practices for Agricultural Structures** IPST.16

- 79 Identify materials used in plumbing. IPST.16.79
- 80 Identify pipe fittings by type. IPST.16.80
- 81 Assemble plastic pipe. IPST.16.81

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**Q Conducting Concrete and Masonry Practices for Agricultural Structures** IPST.17

- 82 Identify materials for concrete construction. IPST.17.82
- 83 Calculate the quantity and cost of materials for a job. IPST.17.83
- 84 Mix concrete. IPST.17.84
- 85 Place concrete in forms. IPST.17.85
- 86 Finish concrete slabs. IPST.17.86

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**R Planning for and Conducting Carpentry Practices for Agricultural Structures** IPST.18

- 87 Identify site planning considerations for agricultural structures. IPST.18.87
- 88 Use plans and working drawings. IPST.18.88
- 89 Figure a bill of materials. IPST.18.89
- 90 Construct an agricultural structure or project. IPST.18.90

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**S Performing Electrical Operations for Agricultural Structures** IPST.19

- 91 Explain the history, use, and function of electrical energy in agriculture. IPST.19.91
- 92 Demonstrate electrical wiring. IPST.19.92

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**T Performing Metal Fabrication Operations for Agricultural Structures** IPST.20

- 93 Identify safe practices in arc welding. IPST.20.93
- 94 Identify types of electrodes, filler rods, and fluxes. IPST.20.94
- 95 Identify metals. IPST.20.95
- 96 Prepare equipment and materials for welding. IPST.20.96
- 97 Perform welding operations. IPST.20.97

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**U Performing Cold Metal Work for Agricultural Structures** IPST.21

- 98 Identify safety practices for metal striking and machine tools. IPST.21.98
- 99 Drill holes, using a metal drill bit. IPST.21.99
- 100 Use metal files and metal cutting tools. IPST.21.100
- 101 Determine tap and die sizes. IPST.21.101
- 102 Cut threads with tap and die. IPST.21.102

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**V Reconditioning Tools** IPST.22

- 103 Identify safe practices for using keen edge tools and grinding equipment. IPST.22.103
- 104 Perform grinding operations with a pedestal/bench grinder and/or portable/hand-held disc/angle grinder. IPST.22.104
- 105 Sharpen common tools. IPST.22.105
- 106 Identify appropriate shapes and angles of cutting edges for wood and metal cutting tools. IPST.22.106